



# Introduction



- Our focus is on what **groups of agents**, rather than individual agents, can achieve.
- Given a set of agents, a coalitional game defines how well each group (or *coalition*) of agents can do for itself.
- We are **not** concerned with:
  - how the agents make individual choices within a coalition;
  - how they coordinate;
- ...instead, we take the payoffs to a coalition as given.



# Definition

- Transferable utility assumption:
  - payoffs may be redistributed among a coalition's members.
  - satisfied whenever payoffs are dispensed in a universal *currency*.
  - each coalition can be assigned a single value as its payoff.

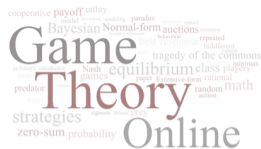


## Definition (Coalitional game with transferable utility)

A **coalitional game with transferable utility** is a pair  $(N, v)$ , where

- $N$  is a finite set of players, indexed by  $i$ ; and
- $v : 2^N \mapsto \mathbb{R}$  associates with each coalition  $S \subseteq N$  a real-valued payoff  $v(S)$  that the coalition's members can distribute among themselves. We assume that  $v(\emptyset) = 0$ .

# Using Coalitional Game Theory



Questions we use coalitional game theory to answer:

1. Which coalition will form?
2. How should that coalition divide its payoff among its members?

The answer to (1) is often “the grand coalition” (all agents in  $N$ ) though this can depend on having made the right choice about (2).



